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A survey of the genus *Eupithecia* (Lepidoptera, Geometridae) in mainland South East Asia: Part I

V. G. Mironov[1] and A. C. Galsworthy[2]

[1] Zoological Institute RAS, Universitetskaya nab. 1, RU-199034, Saint Petersburg, Russia
[2] The Natural History Museum, Cromwell Road, SW7 5BD, London, United Kingdom

Abstract The *Eupithecia* fauna of mainland South East Asia is surveyed in the two parts to this paper, drawing on previous publications and newly collected material. A total of 51 species is recorded, including 15 which are described as new. Habitus and genitalia are illustrated for all new species, and for older species where illustrations are not available in recent papers. A further 6 previously described species are synonymised. Part one of the paper describes the new species.

Key words South Eastern Asia, Lepidoptera, Geometridae, *Eupithecia*, revision, taxonomy, synonymy, distribution, new species, *Eupithecia skoui* Mironov & Galsworthy, sp. n., *Eupithecia macrodisca* Mironov & Galsworthy, sp. n., *Eupithecia szaboi* Mironov & Galsworthy, sp. n., *Eupithecia tropicata* Mironov & Galsworthy, sp. n., *Eupithecia thaica* Mironov & Galsworthy, sp. n., *Eupithecia hreblayi* Mironov & Galsworthy, sp. n., *Eupithecia ronkayi* Mironov & Galsworthy, sp. n., *Eupithecia schnitzleri* Mironov & Galsworthy, sp. n., *Eupithecia stueningi* Mironov & Galsworthy, sp. n., *Eupithecia swanni* Mironov & Galsworthy, sp. n., *Eupithecia burmata* Mironov & Galsworthy, sp. n., *Eupithecia kuni* Mironov & Galsworthy, sp. n., *Eupithecia peregovitsi* Mironov & Galsworthy, sp. n., *Eupithecia herczigi* Mironov & Galsworthy, sp. n., *Eupithecia laoica* Mironov & Galsworthy, sp. n.

Introduction

This paper forms one of a series designed to survey the Asian *Eupithecia* fauna, both assembling records, and clarifying the identity of species described in earlier years, and bringing together new records derived from more recent collecting. It follows papers on *Eupithecia* in the Western Himalayas (Mironov *et al.*, 2008*a*, *b*, *c*), and in Taiwan (Mironov & Galsworthy, 2007). The geographical area covered in this paper is mainland South East Asia, including Myanmar, Thailand, Laos, Vietnam, and Malaysia, and in two cases the Philippines, though it is not a complete survey of the genus in the latter country.

Though extremely species-rich in the Himalayas and in China, the *Eupithecia* fauna of South East Asia is comparatively poor, and, with the exception of a small number of lowland tropical species, virtually confined to the higher mountainous areas of the northern part. In volume 10 of his survey of the moths of Borneo (Holloway, 1997), Jeremy Holloway documented seven species of *Eupithecia*, of which five, *E. mundiscripta* Warren, 1907, *E. subtacincta* Hampson, 1895 (=*tabidaria* Inoue, 1955), *E. melanolopha* Swinhoe, 1895, *E. costalis* Walker, 1863, and *E. rigida* Swinhoe, 1892 are widespread in lowland areas of South East Asia. As Holloway pointed out, the first two are typical *Eupithecia*, but the last three are quite divergent from other members of the genus, and may well need to be separated from it.

Apart from these, Prout (1926) recorded 12 species of *Eupithecia* from a collection made by Captain A. E. Swann at various localities in Kachin State in the extreme north of Myanmar, close to the frontier of Yunnan province, China. Six of these he described as new, *E. russeola*, *E. tricrossa*, *E. acyrtoterma*, *E. anasticta*, *E. leucenthesis*, and *E. leucostaxis*, two were left undetermined (one is described below as a new species: we have not found

the other), and two, *E. robiginascens* Prout, 1926 and *E. albispumata* Warren, 1893 were previously described species. One, *E. eupitheciata* (Walker, 1863) was a previously described species which was subsequently restored (Inoue, 1988) to *Mnesiloba* Warren, 1901, and has since been shown (Holloway, 1997) to be a misidentification of *Eupithecia* (now *Mnesiloba*) *dentifascia* Hampson, 1891. The twelfth species was published as *E. ustata* Moore, 1888, but subsequently described by Prout (1958) as a new species, *E. fulcrata.*

We have been unable to find further records of the genus from the area.

Recent collecting in the mountainous northern areas of Thailand and Vietnam, and in Laos, has produced new material of a number of the species which were described in earlier years, together with further species already known from outside the area, and some new species. The latter are described in the first part of this paper, and the rest will be documented in the second part.

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Abbreviations. BMNH: The Natural History Museum, London, United Kingdom; MNHN: Muséum National d'Histoire Naturelle, Paris; NSMT: National Science Museum, Tokyo, Japan; TTM: Termeszettudomanyi Muzeum Allattara (Hungarian Natural History Museum), Budapest, Hungary; ZFMK: Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany; ZSM: Zoologisches Staatssammlung München, Germany; SMNK: Staatliches Museum für Naturkunde, Karlsruhe, Germany; ZISP: Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia; IAET: Institute of Agriculture and Environment, Estonian Agricultural University, Tartu, Estonia; coll GL: coll. Gyula M. László, Budapest.

New species

Eupithecia skoui Mironov & Galsworthy, **sp. n.** (Fig. 1)

Description (♀). Wingspan 20.5 mm; fore wing 11 mm. Labial palpi covered with brown scales with whitish apices; frons, vertex and notum covered with mixture of brown and whitish scales; metanotum with two small, fan-shaped, upward-protuding groups of pale whitish brown scales. Fore wing narrow and elongate, with slightly arched costal margin, oblique terminal margin and pointed apex; ground colour dirty white; costal area from base

to postmedian transverse line covered with light brown scales; ante- and postmedian transverse lines oblique, sharply angled onto costa, with a conspicuous cream spot exterior to point at which latter reaches costa; terminal area with narrow, longitudinal, brownish apical blotch along costa, with smaller brownish blotch at the end of M_1 and M_2, and with large brownish tornal blotch; discal dot large, ovoid, black; terminal line narrow, dark brown, interrupted by veins. Hind wing ovoid with evenly curved terminal margin; ground colour pale dirty white; basal area small, brownish between Cu and anal margin; traces of brownish transverse lines placed along anal margin; discal dot paler and smaller, but distinct, rounded, light brown; terminal line as fore wing.

Female genitalia (Fig. 17). Bursa copulatrix large, ovoid-orbicular, almost completely and densely covered with small spines, except small area at the base of ductus seminalis. Ductus bursae short, relatively broad, membranous, with obtuse, bulging membranous prominence at base directed posteriorly. Ductus seminalis broadened at base, attached to central part of corpus bursae on left side. Colliculum not clearly expressed, indicated only by two weakly sclerotized blotches. Antrum narrowed, covered with numerous pores. Tergite A8 almost quadrate, with more sclerotized anterior margin. Anterior and posterior apophyses relatively broad, slightly expanded and flattened at apices. Papillae anales sharply tapered to apices, covered with long setae.

Male. Unknown.

Range. Thailand. Known from Changwat Chiang Mai.

Similar species. This species belongs to the *proterva* group (originally 'group B' in Inoue, 1979). It is externally very similar to *E. flavoapicaria* Inoue, 1979 but distinguished from it by the following points: stalk of vein R not covered with black scales in basal area, postmedial transverse line not twice angled near costa, dark tornal spots paler, and brown rather than black, and discal dots larger on fore wings; hind wings with dark basal areas and larger discal dots. The female genitalia are also superficially similar to those of *E. flavoapicaria* Inoue, 1979, but the latter has a narrow, well-formed colliculum.

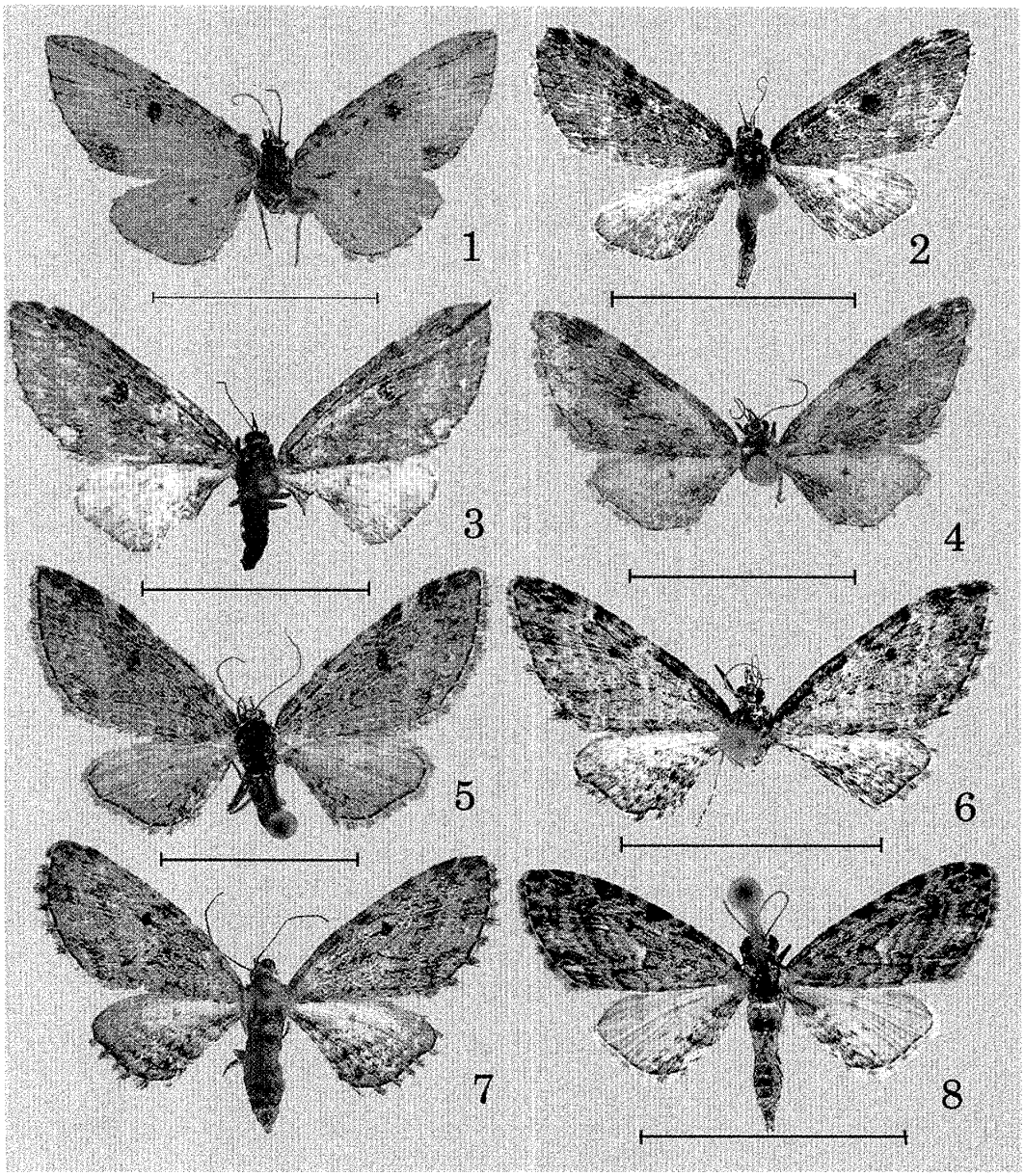
Holotype. ♀, Thailand, Changwat Chiang Mai, Mt Doi Phahompok, 14 km NW of Fang, 2,000 m, 14. ii. 2000, leg. Márton Hreblay, Mironov slide no. 581 ♀ (ZFMK).

Etymology. This species is named in honour of Mr Peder Skou (Stenstrup, Denmark), the owner of the Apollo Books publishing house.

Note. The single type specimen is worn with damaged fringes on all wings.

Eupithecia macrodisca Mironov & Galsworthy, **sp. n.** (Fig. 2)

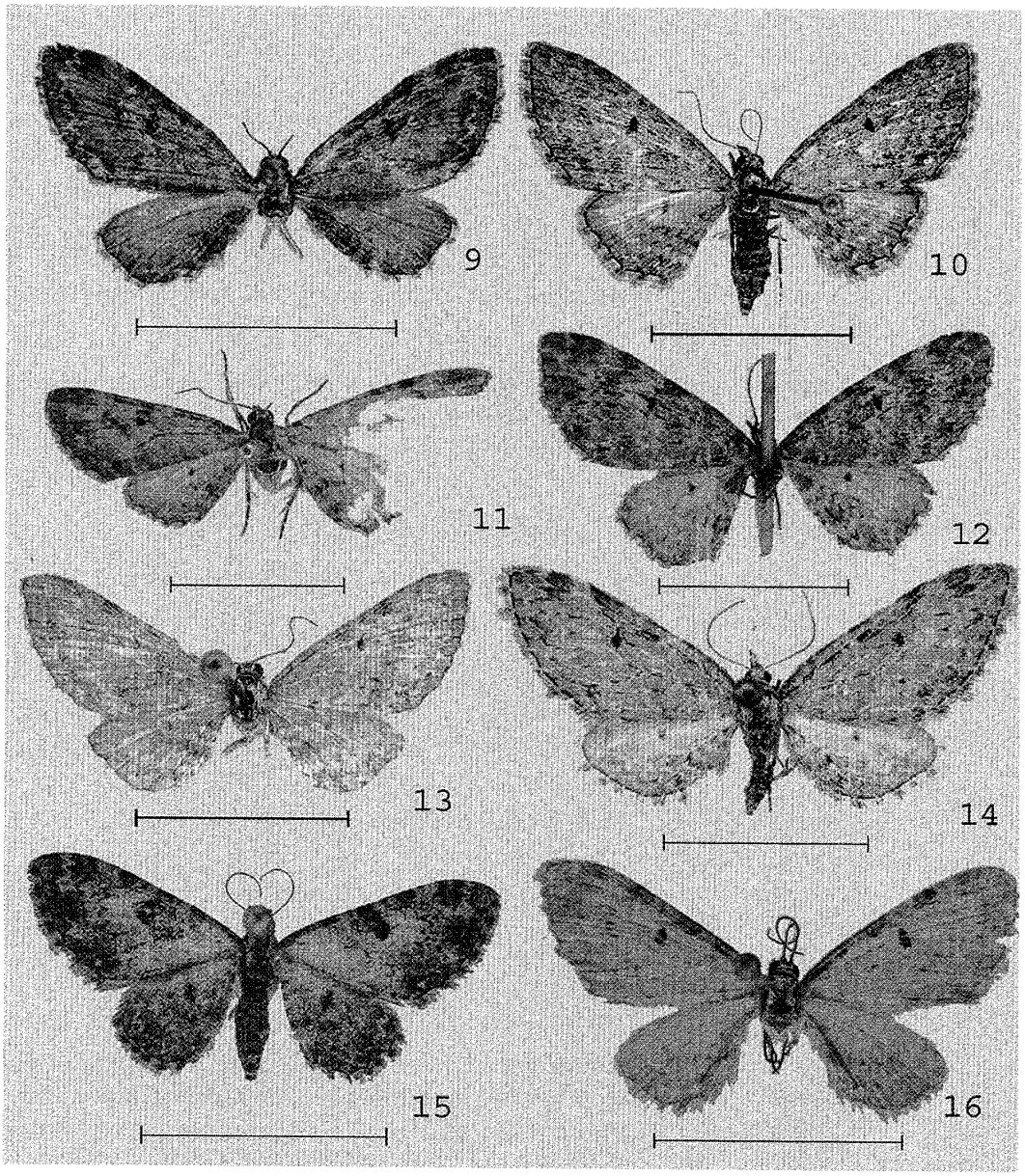
Description (♂). Wingspan 18.5 mm; fore wing 9 mm. Labial palpi dark brown with black apices. Head and notum covered with mixture of black and pale ochreous scales. Fore wing narrow and elongate, costal margin straight but arched near base, terminal margin oblique, apex pointed; ground colour blackish grey; transverse lines indistinct; ante- and postmedian lines right angled onto costa; broad band between medial and terminal areas ochreous, forming a large rusty costal spot; terminal area mainly rusty ochreous but blackish grey near apex and tornus, with a series of blackish longitudinal hatchings between veins and with a series of small white dots on these hatchings, also with small white tornal spot; discal dot very large, rounded or ovoid, black; terminal line blackish grey, interrupted by veins; fringes weakly chequered rusty ochreous and grey. Hind wing narrow and elongate, with concave terminal margin and narrowly rounded apex; ground colour paler, whitish grey with ochreous tinge; basal area and transverse lines blackish, distinct along anal margin



Figs 1–8. *Eupithecia* adults (scale bars=1 cm). 1. *E. skoui* Mironov & Galsworthy, sp. n. (holotype). 2. *E. macrodisca* Mironov & Galsworthy, sp. n. (holotype). 3. *E. szaboi* Mironov & Galsworthy, sp. n. (holotype). 4. *E. tropicata* Mironov & Galsworthy, sp. n. (holotype). 5. *E. thaica* Mironov & Galsworthy, sp. n. (holotype). 6. *E. hreblayi* Mironov & Galsworthy, sp. n. (holotype). 7. *E. schnitzleri* Mironov & Galsworthy sp. n. (paratype ♀). 8. *E. schnitzleri* Mironov & Galsworthy, sp. n. (holotype ♂).

only; terminal area slightly darker; discal dot smaller and paler, conspicuous, rounded, dark grey; terminal line and fringes as fore wing.

Male genitalia (Fig. 20). Uncus stout, short, biapical. Valve medium-sized, rather narrow, with convex dorsal margin near base, medially sinuate ventral margin and with pointed apex; sacculus sclerotized near base. Vinculum short, rather narrow, semicircular. Papillae on the anterior arms of labides elongate, narrow, covered with medium-sized setae in apical half. Aedeagus relatively large, stout, slightly curved with broadened anterior end. Vesica with transverse wrinkles, armed with one large, long and broad, curved, H-shaped cornutus



Figs 9–16. *Eupithecia* adults (scale bars=1 cm). 9. *E. ronkayi* Mironov & Galsworthy, sp. n. (holotype). 10. *E. stueningi* Mironov & Galsworthy, sp. n. (paratype). 11. *E. swanni* Mironov & Galsworthy, sp. n. (holotype). 12. *E. burmata* Mironov & Galsworthy, sp. n. (holotype). 13. *E. kuni* Mironov & Galsworthy, sp. n. (paratype). 14. *E. peregovitsi* Mironov & Galsworthy, sp. n. (paratype). 15. *E. herczigi* Mironov & Galsworthy, sp. n. (holotype). 16. *E. laoica* Mironov & Galsworthy, sp. n. (holotype).

and one smaller, folded, irregular cornutus at anterior end of aedeagus. Sternite A8 small, peg-like, broadened at base and sharply narrowed to apex, with almost parallel margins from the middle to apex; basal hollow broad and shallow.

Female. Unknown.

Range. Thailand. Known from Changwat Chiang Mai.

Similar species. This species also belongs to the *proterva* group. It is distinguished from all known species of this group by the unique colour, maculation and large discal dots on

the fore wings. Externally it is a little similar to the preceding species *E. skoui* sp. n., but generally much darker than this latter, the antemedian and especially postmedian transverse lines forming a more pointed angle near the costa behind the discal dot, the dark tornal blotches on the fore wings and discal dots on the hind wings smaller, and the discal dots on the fore wings larger than those in *E. skoui*. The male genitalia are somewhat similar to those of the Taiwanese *E. hashimotoi* Inoue, 1988. However, the combination of the smaller uncus, broadened when viewed laterally, the shorter, semicircular vinculum, the longer papillae on the anterior arms of the labides, the shorter, slightly sinuate aedeagus, the shorter, curved large cornutus on the vesica and the slim, narrower eighth sternite can be used for determination of *E. macrodisca* sp. n.

Holotype. ♂, Thailand, Changwat Chiang Mai, Mt Doi Phahompok, 18 km NW of Fang, 2,100 m, 7. ii. 2000, leg. Hreblay & Szabó, Mironov slide no. 582 ♂ (ZFMK). Paratype. 1 ♂, same locality, date and collectors, Mironov slide no. 583 ♂ (ZFMK).

Eupithecia szaboi Mironov & Galsworthy, **sp. n.** (Fig. 3)

Description (♀). Wingspan 22 mm; fore wing 12 mm. Labial palpi narrow and long, about twice as long as diameter of eye, covered with brown scales. Fore wing narrow, elongate; costal margin straight; termen slightly curved, oblique; apex pointed; ground colour pale brown with reddish tinge; R and Cu veins covered with black scales; medial area darker, dark brown; transverse lines inconspicuous, postmedial line oblique, right angled on to costa behind discal dot; terminal area with narrow, oblique blackish streak, inconspicuous light wavy subterminal line and large yellow tornal spot; discal dot large, ovoid, black; terminal line dark brown; fringes dirty white and brownish on the ends of veins. Hind wing rather triangular, with oblique terminal margin and narrowly rounded apex; ground colour pale brown, unicolorous but slightly darker to terminal margin, covered with brown scales along anal margin; transverse lines not expressed; discal dot small, rounded, brown; terminal line and fringes as fore wing.

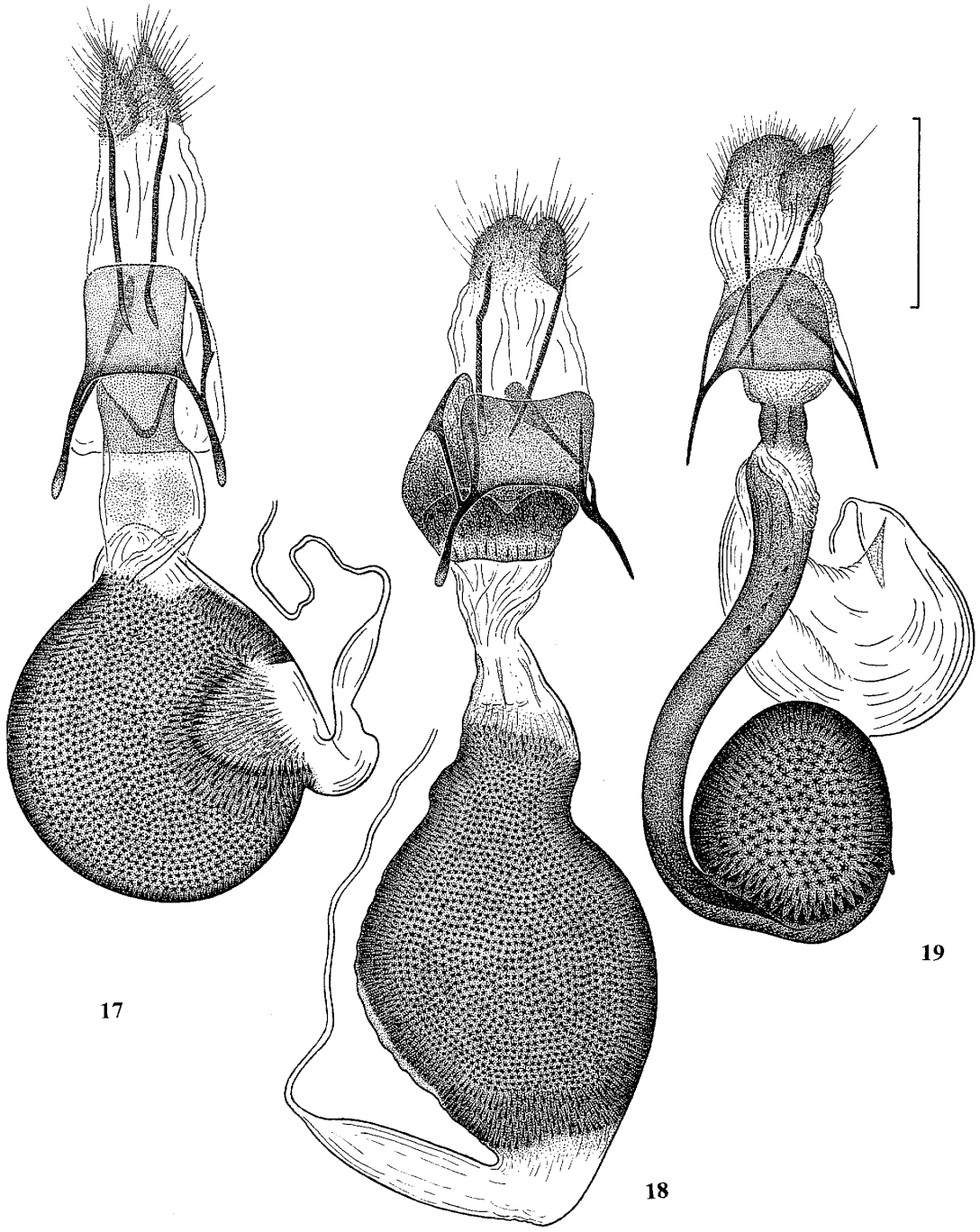
Male. Unknown.

Female genitalia (Fig. 18). Bursa copulatrix large, broad, fusiform, completely covered with small spines; ductus bursae short, membranous; ductus seminalis broadened at base, sharply curved to right, broadly attached to anterior end of corpus bursae; colliculum not expressed; antrum broad, membranous in anterior part and heavily sclerotized in posterior part, with numerous wrinkles and pores; tergite A8 rectangular, with sclerotized anterior margin, two heavily sclerotized lateral "vessels" and rounded posterior corners; anterior and posterior apophyses relatively short, both right apophyses slightly expanded and flattened at their apices; anterior apophyses thicker than posterior; papillae anales rounded, covered with relatively long setae.

Range. Thailand. Known from Province Chiang Mai.

Similar species. This species belongs to the *proterva* group and is externally similar to *E. macrodisca* sp. n., but clearly distinguished from it by the paler colour of the fore and hind wings, the bean-shaped discal dots and the presence of large yellow tornal spots on the fore wings. The female genitalia of *E. szaboi* sp. n. can easily be distinguished from those of all other *Eupithecia* species including the species of the *proterva* group by the combination of the shape of the bursa copulatrix, the disposition of the ductus seminalis, the numerous small spines which completely cover the corpus bursae and the heavily sclerotized antrum.

Holotype. ♀, Thailand, Prov. Chiang Mai, Mt Doi Phahompok, 20 km NW of Fang, 2,150



Figs 17–19. Female genitalia of *Eupithecia* species (scale bar=1 mm). 17. *E. skoui* Mironov & Galsworthy, sp. n. 18. *E. szaboi* Mironov & Galsworthy, sp. n. 19. *E. stueningi* Mironov & Galsworthy, sp. n.

m, 23–25. i. 2004, leg. A. Szabó, Mironov slide no. 572 ♀ (coll. GL).

Etymology. This species is named in honour of the zealous collector of Lepidoptera Mr Attila Szabó (Kiskunfélegyháza, Hungary).

Eupithecia tropicata Mironov & Galsworthy, **sp. n.** (Fig. 4)

Description (♂). Wingspan 18 mm; fore wing 9.5 mm. Labial palpi dark brown. Head and notum black. Metanotum with two small, fan-shaped, groups of black scales protuding upwards. Fore wing narrow, elongate, with slightly bowed costal margin, oblique terminal margin and pointed apex; ground colour fuscous, blackish grey; transverse lines indistinct; postmedian line oblique, sharply angled onto costa; transverse bands between basal and medial areas and between medial and terminal areas ochreous, the last band forming a large, distinct ochreous costal spot; anal vein covered with ochreous scales near base, before and behind medial area; terminal area blackish grey near apex and tornus, and ochreous in medial part, with distinct, relatively large ochreous tornal spot; discal dot relatively large, oblique, ovoid, intensely black; terminal line blackish, interrupted by veins; fringes pale, slightly chequered pale ochreous and pale grey. Hind wing narrow and elongate, with slightly concave terminal margin and with narrowly rounded apex; ground colour paler, dirty white or whitish grey with ochreous tinge; basal area between stalk of Cu and anal margin covered with black scales; terminal area slightly darker with small blackish and ochreous spots near tornus; discal dot smaller, distinct, rounded, black; terminal line and fringes as fore wing. Abdomen black.

Male genitalia (Fig. 21). Uncus short and narrow, pointed, biapical. Valve small, but elongate and narrow, evenly tapered to apex and curved near apex, with slightly bowed dorsal margin and narrowly rounded apex; sacculus lightly sclerotized. Vinculum short, relatively narrow, with very shallow medial hollow. Papillae on the anterior arms of labides elongate and narrow, covered with short setae at apices. Aedeagus large, stout, slightly sinuate, broadened at anterior end, considerably longer than length of valve. Vesica multiply granulate, in obliquely-transverse wrinkles, armed with one elongate and broad, slightly curved, H-shaped cornutus, with two elongate anterior arms and a smaller, folded, irregular cornutus at anterior end of aedeagus, as in other related species. Sternite A8 lightly sclerotized, small, peg-like, broadened at base and narrowed to apex, with two very small, short apical horns; basal and apical hollows very shallow.

Female. Unknown.

Range. Thailand. Known from Changwat Chiang Mai.

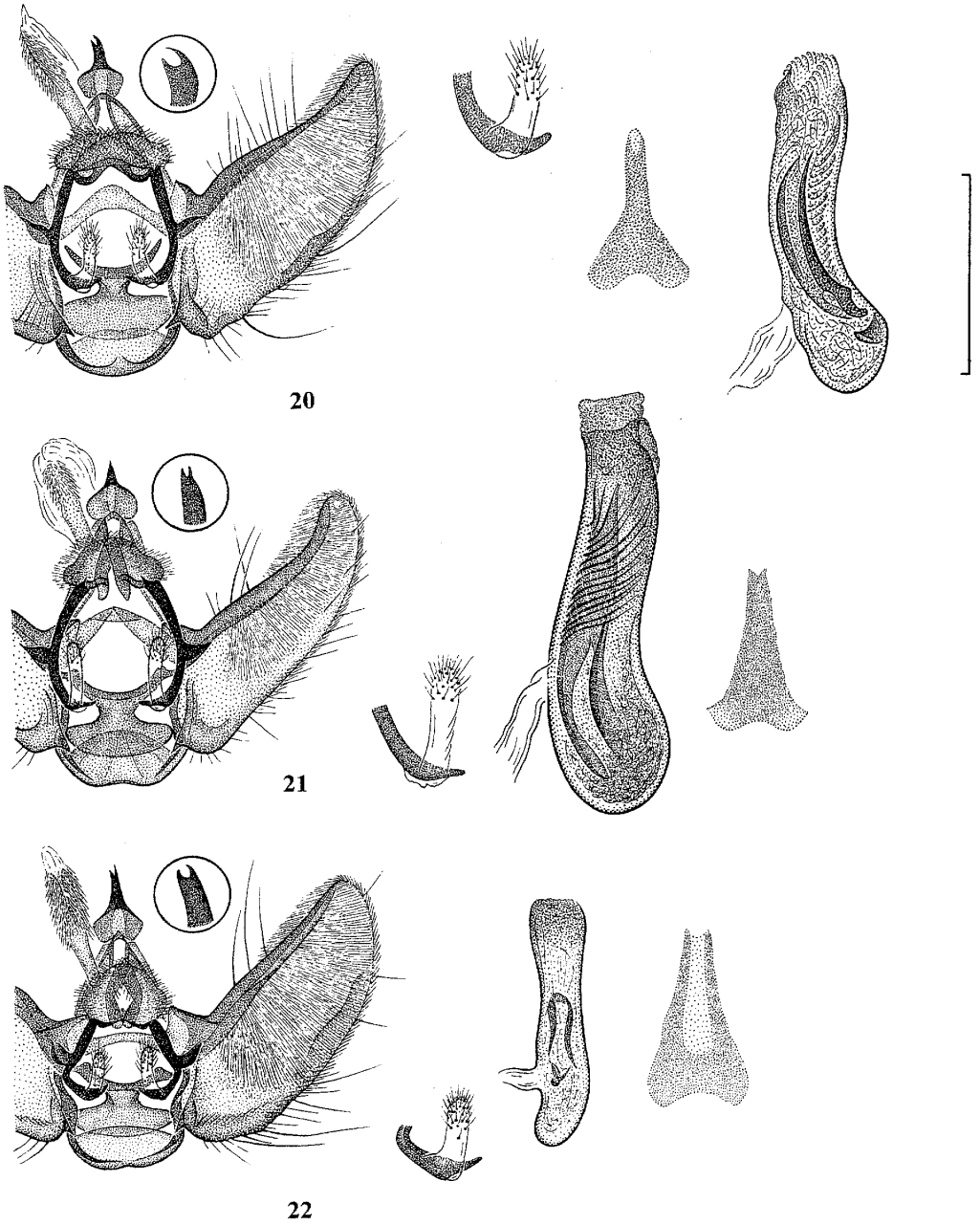
Similar species. This species belongs to the *proterva* group, and is distinguished from all known species of this group by the darker ground colour of the fore wing with a distinct ochreous costal spot between medial and terminal areas. The male genitalia of *E. tropicata* distinguish this species from other allied species of the *proterva* group. The shapes of valve and vinculum are rather similar to those of *E. lucigera* Butler, 1889, but in the new species the uncus is shorter, the papillae on the anterior arms of the labides are longer, the aedeagus is larger, longer, and slightly sinuate, with a broadened anterior end, and the cornutus on the vesica and the eighth sternite have different shapes.

Holotype. ♂, Thailand, Changwat Chiang Mai, Mt Doi Phahompok, 14 km NW of Fang, 2,000 m, 14. ii. 2000, leg. Márton Hreblay, Mironov slide no. 584 ♂ (ZFMK).

Note. The single type specimen is worn.

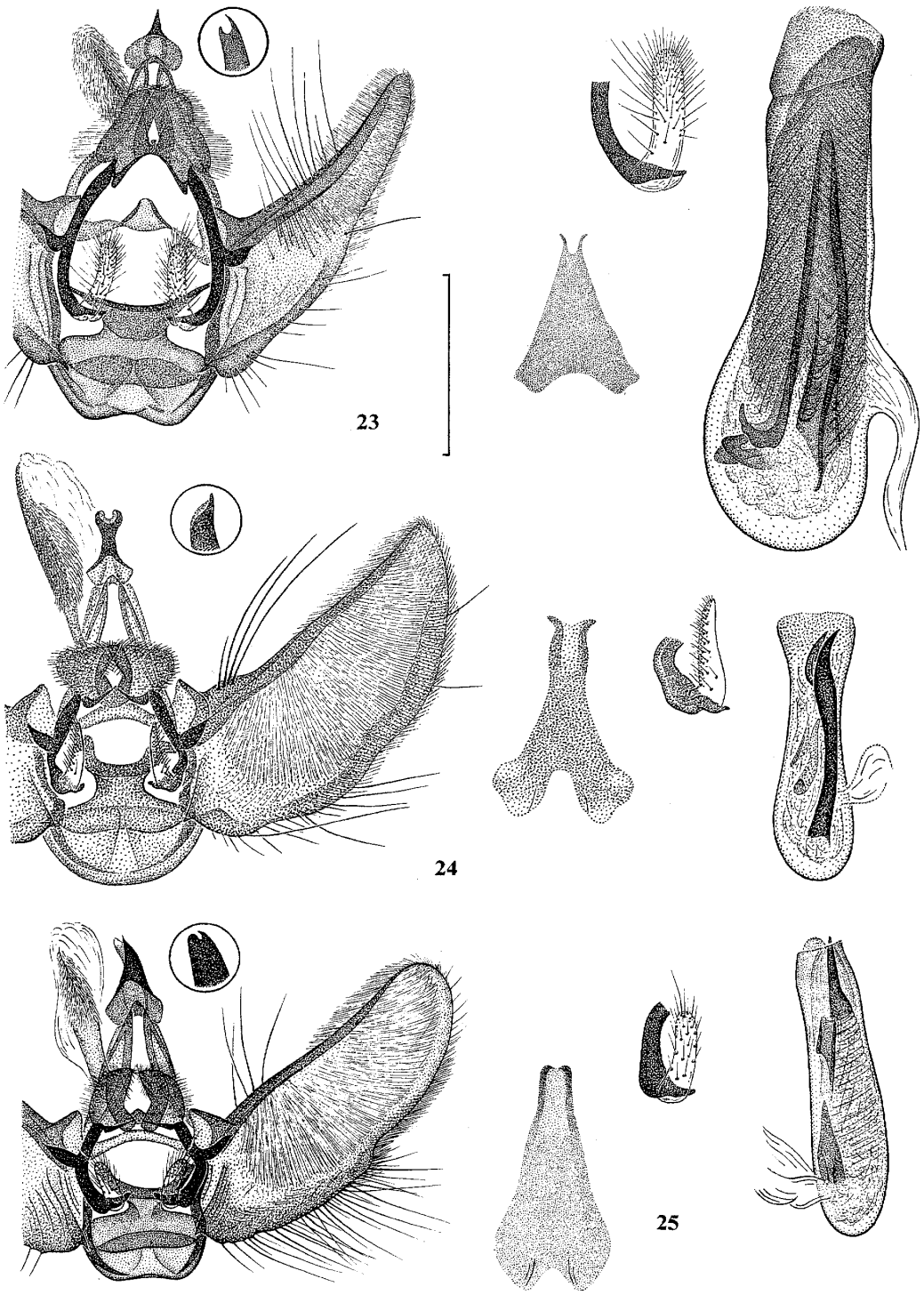
Eupithecia thaica Mironov & Galsworthy, **sp. n.** (Fig. 5)

Description (♂). Wingspan 24 mm; fore wing 13.5 mm. Labial palpi slightly longer than diameter of eye, covered with light brown scales. Head covered with light yellowish and



Figs 20–22. Male genitalia of *Eupithecia* species (scale bar=1 mm: with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged). 20. *E. macrodisca* Mironov & Galsworthy, sp. n. 21. *E. tropicata* Mironov & Galsworthy, sp. n. 22. *E. ronkayi* Mironov & Galsworthy, sp. n.

brownish scales. Fore wing elongate, rather narrow, with bowed costal margin and pointed apex; ground colour brownish ochreous; stalk of R covered with black scales from base to discal dot; basal, medial and terminal areas divided by yellowish costal spots; basal and antemedial transverse lines sharply angled onto costa; postmedial line oblique, wavy, twice sharply angled near costa, broadened and forming a dark costal spot; terminal area dark, brownish black near apex, with pale yellowish wavy subterminal line and dark blackish tornal spot; discal dot relatively large, ovoid-acuminate, black; terminal line relatively broad, dark brown, interrupted by vein ends; fringes chequered pale yellow and brown. Hind wing



Figs 23–25. Male genitalia of *Eupithecia* species (scale bar=1 mm: with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged). 23. *E. thaica* Mironov & Galsworthy, sp. n. 24. *E. schnitzleri* Mironov & Galsworthy, sp. n. 25. *E. stueningi* Mironov & Galsworthy, sp. n.

elongate and narrow, with narrowly rounded apex and concave terminal margin; ground colour pale yellowish white; dark transverse lines well marked along anal margin; terminal area bordered by a very wavy transverse line; discal dot small, rounded, pale brown; termi-

nal line and fringes as fore wing.

Male genitalia (Fig. 23). Uncus stout, very short, biapical. Valve elongate, narrow, sharply narrowed to apex; sacculus sclerotized near base. Vinculum very short, broad, trapezoid with shallow medial hollow. Papillae on the anterior arms of labides elongate, finger-shaped, densely covered with long and medium-sized setae. Aedeagus very large, stout, broadened at anterior end, considerably longer than valve. Vesica with oblique wrinkles, armed with one large, long and broad, V-shaped cornutus and one smaller, folded, irregular cornutus at anterior end of aedeagus. Sternite A8 relatively small, peg-like, broadened at base and sharply narrowed to apex, with two short, narrow, apical horns; basal hollow broad and shallow.

Female. Unknown.

Range. Thailand. Known from Changwat Chiang Mai (Mt Doi Inthanon).

Similar species. This species belongs to the *proterva* group. It is externally rather similar to *E. convexa* Inoue, 1988, but can be distinguished from that species by the black stalk of vein R, the sharp angles in the basal and antemedial transverse lines near the costa and the larger ovoid-acuminate discal dots on the fore wings. The male genitalia are rather similar to those of the preceding species, *E. tropicata* sp. n.: however, they are somewhat larger, the valve longer and narrower towards the apex, and the aedeagus about 1.5 times longer and broader, and sternite A8 broader, especially at base, with two very narrow apical horns.

Holotype. ♂, Thailand, Doi Inthanon, 18°34′N, 98°59″E GPS, 2,300 m, 17. i. 1997, leg. Malicky, Mironov slide no. 613 ♂ (ZSM).

Eupithecia hreblayi Mironov & Galsworthy, **sp. n.** (Fig. 6)

Description (♀). Wingspan 18–19 mm; fore wing 9–9.5 mm. Labial palpi light brown. Head and notum covered with light, whitish ochreous scales. Fore wing triangulate with slightly arched costal margin, evenly curved terminal margin and pointed apex; ground colour a combination of pale ash grey and pale rusty brownish; basal area rusty brownish with black Sc; medial area divided by broad, pale ash grey transverse band; inner half of medial area brown along costa with black Sc; outer half of medial area rusty brownish with veins covered with black scales; postmedian line straight, twice angled onto costa; terminal area rusty brownish with three blackish brown blotches (apical, medial and tornal) and with a series of blackish brown hatches between veins; subterminal line distinct, dentate, whitish, forming a whitish, narrow and elongate tornal spot; discal dot small, rounded or ovoid, intensely black; terminal line broad, blackish brown, interrupted by veins; fringes distinctly chequered pale ash grey and brown. Hind wing elongate, angulate, with concave terminal margin and narrowly rounded apex; ground colour paler, whitish grey with brownish tinge; transverse lines dark blackish brown, clearly marked along anal margin only; terminal area narrow, darker, whitish brown with very dentate inner margin; discal dot considerably smaller and paler, rounded; terminal line as on fore wing; fringes with longer light, whitish grey intervals than on fore wing. Abdomen covered with blackish scales with transverse bands of lighter, rusty brownish scales on the end of each segment.

Female genitalia (Fig. 26). Bursa copulatrix ovate, almost completely and densely covered with stout spines except along right side and small area near colliculum, also with a short row of slim spines along right side from base of ductus seminalis to colliculum. Ductus bursae not well expressed. Ductus seminalis narrow, slightly broadened to base, strongly curved backward; attached to middle part of corpus bursae from right side. Colliculum col-

lar-like, relatively short and narrow, inclined to right. Antrum membranous, covered with numerous pores from colliculum to eighth tergite. Tergite A8 short and narrow, slightly broadened in posterior part, with sclerotized anterior and lateral margins and with medial membranous hollow in the posterior margin. Anterior and posterior apophyses relatively elongate, narrow; posterior apophyses slightly expanded and flattened at apices. Papillae anales slightly elongate, tapered to apices, covered with short and medium-sized setae.

Male. Unknown.

Range. Thailand. Known from Changwat Chiang Mai.

Similar species. This species belongs to the *proterva* group: it is close to *E. proterva* Butler, 1878, but can easily be distinguished from it by the narrower wings, the rusty or ochreous tinge, and the straight antemedian transverse line on the fore wing, which is very sharply angled from discal dot onto the costa in *E. proterva*. The female genitalia can easily be distinguished from those of *E. proterva* by the larger, stouter spines in the general spiniferous area, the shorter row of shorter and stouter spines between base of ductus seminalis and colliculum, and also by the narrower eighth tergite.

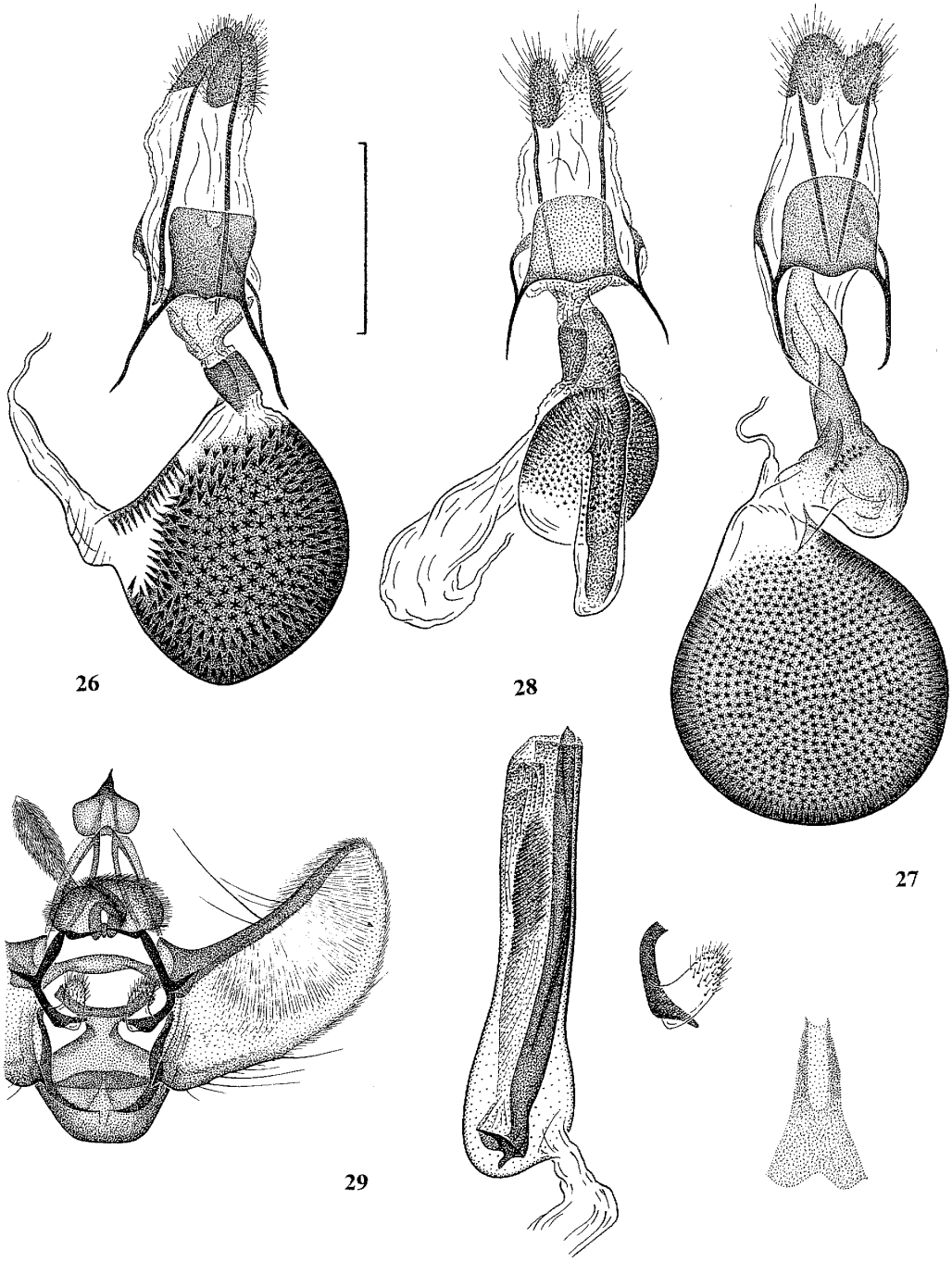
Holotype. ♀, Thailand, Changwat Chiang Mai, Mt Doi Inthanon, NP, 2,300 m, 28. i. 2000, leg. Márton Hreblay, Mironov slide no. 585 ♀ (ZFMK). Paratype. 1 ♀, same locality, 13. ii. 2000, leg. Márton Hreblay (ZFMK).

Etymology. This species is named in honour of the zealous collector of Lepidoptera and well-known specialist on Noctuidae, Dr Márton Hreblay (Érd near Budapest, Hungary), who died in a tragic car-accident in Thailand in October 2000.

Eupithecia ronkayi Mironov & Galsworthy, **sp. n.** (Fig. 9)

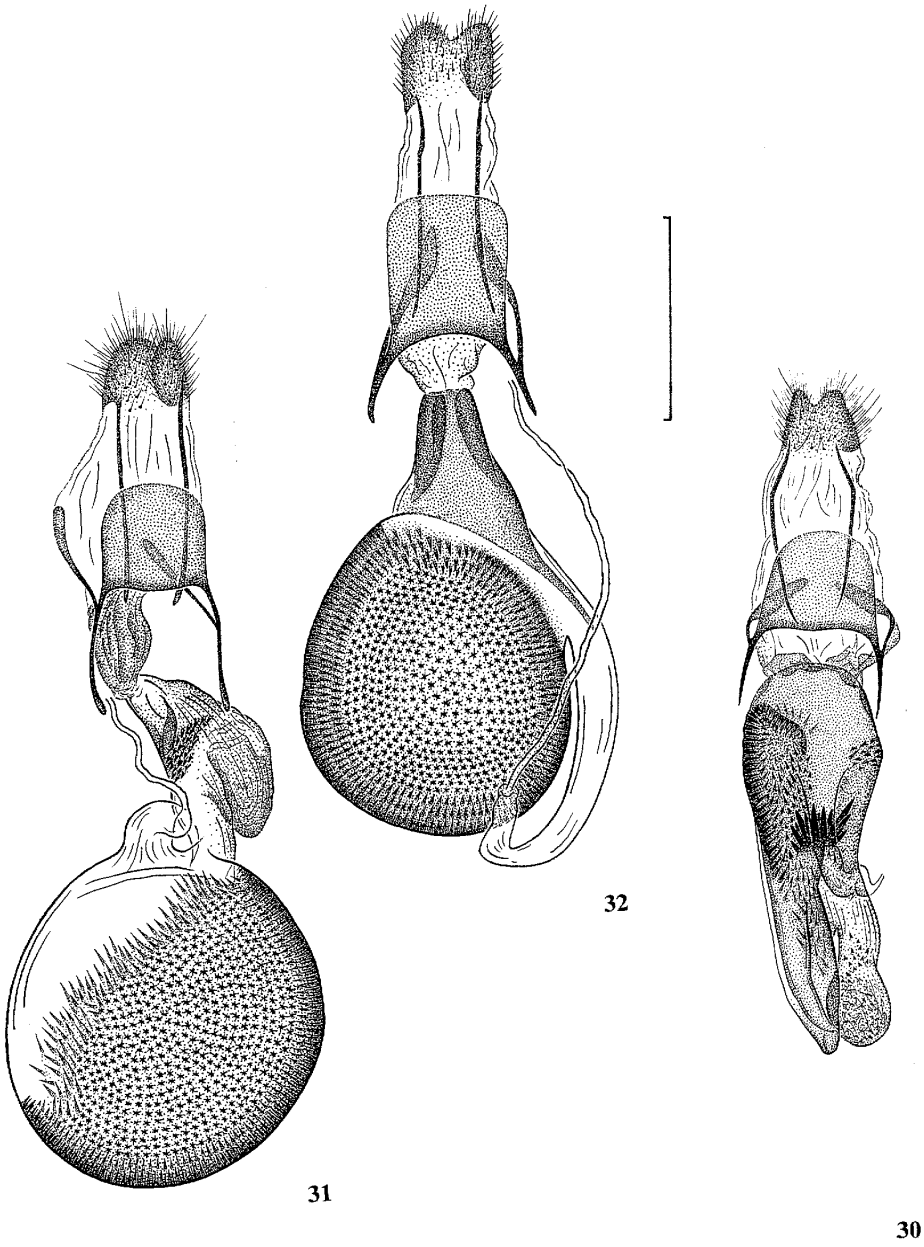
Description (♂♀). Wingspan 16.5–17 mm; fore wing 8–8.5 mm. Labial palpi, frons and vertex brown. Notum brown. Fore wing relatively elongate and narrow, costal margin arched, terminal margin oblique, evenly curved, tornus rounded, apex narrowly rounded; ground colour dark brown with soft reddish tinge; transverse lines inconspicuous; postmedian line pale, broad, twice angled onto costa, accompanied proximally by a series of narrow and elongate black dashes on the veins; terminal area narrow, with distinct, dentate, whitish subterminal line and large, white tornal spot; apex covered with blackish brown scales; discal dot large, oblique, ovoid, intensely black; terminal line broad, blackish brown, interrupted by veins; fringes short, chequered pale rusty brown and brown. Hind wing moderately narrow, angulate, with concave terminal margin; ground colour greyish white; area between Cu vein and anal margin darker, blackish brown; tornal area with a series of small orange dots on M_3, Cu_1, Cu_2 and between A vein and anal margin, and also with small whitish tornal dot; discal dot smaller and paler, brownish, lozenge-shaped; terminal line and fringes as fore wing.

Male genitalia (Fig. 22). Uncus elongate, biapical. Valve with straight dorsal margin and almost parallel dorsal and ventral margins, with narrowly rounded apex; sacculus lightly sclerotized. Vinculum short and broad. Papillae on the anterior arms of labides slightly elongate, narrow, covered with short setae. Aedeagus slim, shorter than length of valve. Vesica armed with one slim, narrow, U-shaped cornutus at the middle and with one small, folded, irregular cornutus near ductus ejaculatorius base. Sternite A8 weakly sclerotized, broadened at base with two narrow elongate, almost parallel apical arms with blunt apices, which are connected by a short and broad basal band; basal hollow broad and shallow; apical hollow membranous, narrow and deep.



Figs 26–29. Male and female genitalia of *Eupithecia* species (scale bar=1 mm: male with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged). 26. *E. hreblayi* Mironov & Galsworthy, sp. n. 27. *E. ronkayi* Mironov & Galsworthy, sp. n. 28. *E. schnitzleri* Mironov & Galsworthy, sp. n. 29. *E. peregovitsi* Mironov & Galsworthy sp. n.

Female genitalia (Fig. 27). Bursa copulatrix large, globular, completely covered with small spines. Ductus bursae elongate, curved, with a globular membranous diverticulum from the left and a small oblique patch of very small, short spinules at its base. Ductus seminalis narrow, slightly broadened at base, attached to base of ductus bursae from right side. Colliculum collar-like, relatively small, short and narrow, lightly sclerotized. Antrum membranous. Tergite A8 almost quadrate with medially convex and sclerotized anterior margin



Figs 30–32 . Female genitalia of *Eupithecia* species (scale bar=1 mm). 30. *E. burmata* Mironov & Galsworthy, sp. n. 31. *E. swanni* Mironov & Galsworthy, sp. n. 32. *E. peregovitsi* Mironov & Galsworthy, sp. n.

and with convex posterior margin and rounded corners. Anterior and posterior apophyses of average length and narrow. Papillae anales broad, rounded, covered with short setae.

Range. West Myanmar (Chin State) and North Thailand (Chiangmai Province).

Similar species. This species is allied and similar to *E. raniata* Prout, 1958. However, *E. ronkayi* is darker, the light subterminal line more distinct and more dentate, the light tornal spot larger on the fore wing, and the hind wing has a series of small orange dots in the tornal area which are absent in *E. raniata*. No significant structural differences can be found in the male genitalia from those of *E. raniata*. The female genitalia are very well distinguished by the smaller patch of smaller spines in the ductus bursae, the shorter eighth ter-

gite and the shorter apophyses, especially the posterior ones.

Holotype. ♀, N. Thailand. Chiangmai Prov., Doi Phahompok, 1,850 m, 25–27. xi. 2000, leg. D. Stüning, Mironov slide no. 586 ♀ (ZFMK). Paratype. 1 ♂, W. Myanmar, Chin State, *ca* 6 miles W. Kanpetlet, way to Mt Viktoria, prim. forest/pine forest, 21°12′N, 93°59′E, 2,060 m, 3. x. 2002, at light, leg. W. Mey & S. Naumann, Mironov slide no. 587 ♂ (ZFMK).

Etymology. This species is named in honour of the Hungarian lepidopterist and well-known specialist on Noctuidae, Dr László Ronkay (Hungarian Natural History Museum, Budapest, Hungary).

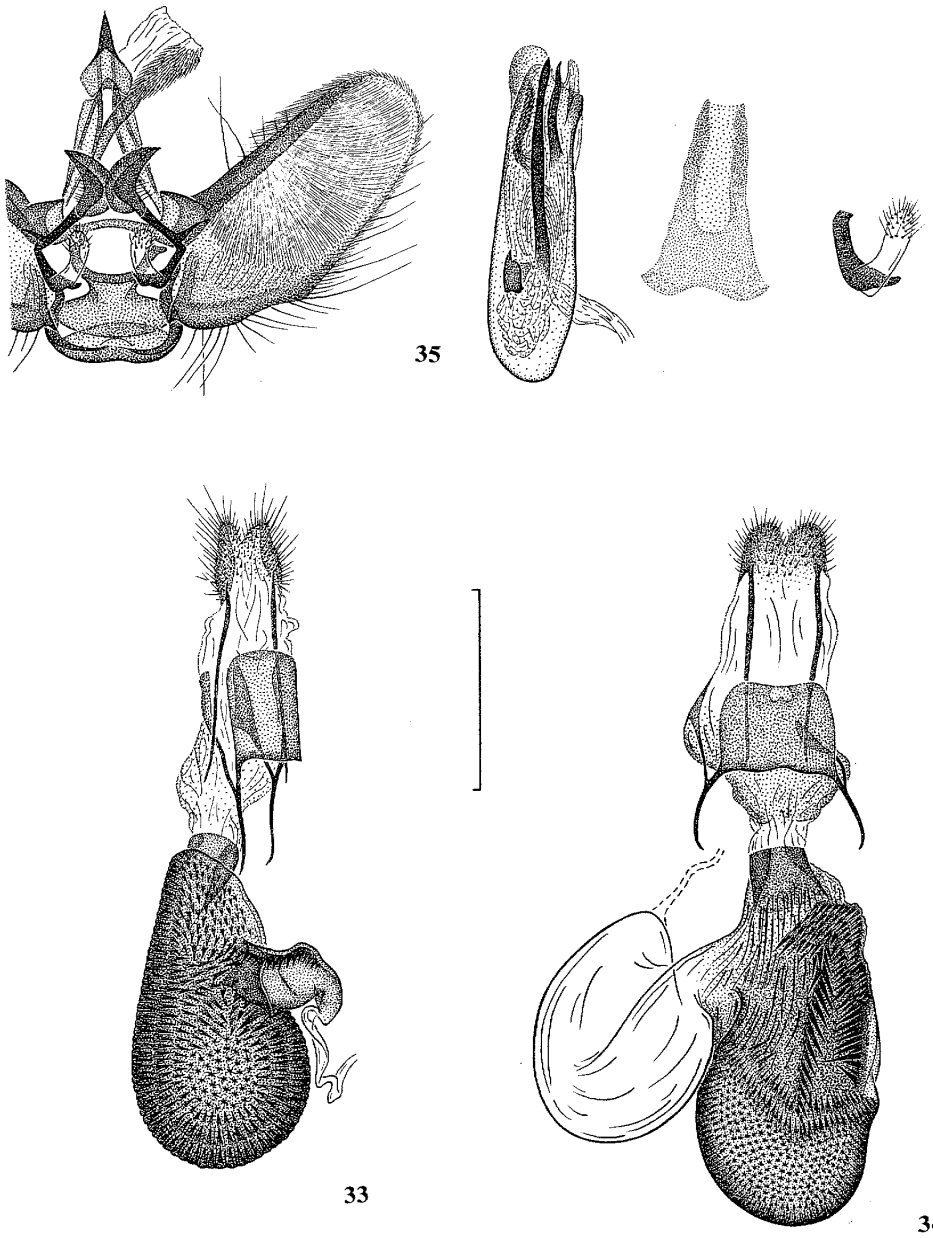
Note. Both type specimens are worn.

Eupithecia schnitzleri Mironov & Galsworthy, **sp. n.** (Fig. 7 (♀), Fig. 8 (♂))

Description (♂♀). Wingspan 14–18 mm; fore wing 7–10 mm. Labial palpi covered with whitish grey scales. Frons with prominent tuft of brownish scales. Head covered with whitish grey scales with transverse band of dark grey or brown scales between bases of antennae. Thorax covered with mixture of whitish and dark grey scales. Fore wing narrow, elongate, with slightly arched costal margin, evenly curved terminal margin and relatively pointed apex; ground colour ash grey with brownish tinge; transverse lines paler, distinct, oblique; median line oblique, sinuate, sharply angled onto costa behind discal dot; postmedian line with broad brownish grey shading on inner side; terminal area with distinct whitish, dentate subterminal line and with three paler spots (apical, medial and tornal); discal dot conspicuous, small, rounded or ovoid, black; terminal line narrow, black, interrupted by veins; fringes short, distinctly chequered dark brownish grey and dirty white. Hind wing rather narrow, slightly elongate with very shallow hollow in terminal margin and narrowly rounded apex; in male, ground colour clear white; all transverse lines dark brownish grey, distinctly marked along anal margin only; in female, ground colour darkened with scattering of brown scales, and transverse lines fully visible across wing; in both sexes discal dot considerably smaller and paler, from round to narrow and elongate; terminal line as on fore wing; fringes chequered as on fore wing but with longer white intervals. Abdomen thin, covered with pale ash grey scales, usually with small, elongate black lateral spots on A4–A6 segments.

Male genitalia (Fig. 24). Uncus elongate, broadened to apex with two small rounded apical lobes visible when viewed ventrally or dorsally. Valve broad at base, dorsal margin straight, enlarged near base; ventral margin evenly curved and apex pointed; sacculus lightly sclerotized. Vinculum short and broad, semicircular. Papillae on the anterior arms of labides long and narrow, evenly tapered to apices, covered with short setae along outer sides. Aedeagus narrow and somewhat waisted, shorter than length of valve. Vesica armed with one long and relatively thin, slightly sinuate horn-like cornutus, one shorter, sharply curved apical horn-like cornutus and one small, flat, H-shaped cornutus at the middle. Sternite A8 peg-like, very narrow in apical half, with two broad square-ended basal lobes and with two short and narrow, heavily sclerotized, diverging apical arms.

Female genitalia (Fig. 28). Bursa copulatrix small, ovoid, almost completely covered with small spines, especially densely along left side, with spineless, membranous base and sclerotized, long and relatively narrow, digitiform process attached almost to base of colliculum and directed anteriorly. Ductus bursae not expressed. Ductus seminalis long and broad, curved, attached to middle part of corpus bursae from right side. Colliculum collar-like, relatively large, broad and elongate, slightly inclined to right. Antrum short, membranous.



Figs 33–35. Male and female genitalia of *Eupithecia* species (scale bar=1 mm: male with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged). 33. *E. kuni* Mironov & Galsworthy, sp. n. 34. *E. herczigi* Mironov & Galsworthy, sp. n. 35. *E. laoica* Mironov & Galsworthy, sp. n.

Tergite A8 small, almost quadrate, with sclerotized anterior margin and rounded posterior corners. Anterior and posterior apophyses of normal length and rather narrow. Papillae anales small, slightly elongate, rounded.

Range. Thailand. Known from Chiangmai Province.

Similar species. This species belongs to a very distinct species group which we propose to call the *kamburonga* species group, in which the uncus of the male genitalia is produced at the apex into a bispatulate lobe: other members of the group include *E. kamburonga* Holloway, 1976 (Borneo), *E. yoshimotoi* Inoue, 1988 (Taiwan), *E. kuroshio* Inoue, 1980

(Japan), and *E. liberata* Inoue, 2000 (Nepal).

E. schnitzleri sp. n. is externally rather similar to *E. lariciata* (Freyer, 1842), but is smaller, with narrower wings, a more oblique and more sharply angled median line on the fore wing and clear white hind wings in the male. The male genitalia of all members of this group are very similar, and are most easily separated by the ornamentation of the aedeagus vesica. In particular, the cornutus near the apex of the aedeagus is narrow and curved in *E. schnitzleri*, broad and with the apical half almost straight in *E. yoshimotoi*, sharply curved into a complete U-shape in *E. kuroshio*, and absent in *E. liberata*. The female genitalia of *E. schnitzleri* are very unusual, and can be easily distinguished from those in any other species by the combination of the long digitiform process, the disposition of spines in the corpus bursae, the large, broad and elongate colliculum and the large, broad ductus seminalis.

Holotype. ♂, Thailand, Chiangmai, Doi Suthep, 1,325 m, Meo Village View Point, 22. xi–4. xii. 1989, leg. Schnitzler (ZFMK). Paratypes. 5 ♂ 1 ♀, same locality, date and collector, Mironov slides nos 611 ♀, 612 ♂ (ZFMK, two paratypes in ZISP); 1 ♂, N. Thailand, prov Chiengmai, 1,400 m, 4 km S of Kop Dong, 99°03′E 19°52′N, 29–30. x. 2002, leg. B. Herczig & G. Ronkay, Galsworthy slide no. ACG GL83 (coll. GL); 1 ♀, same locality and collectors, 1,800 m (coll. GL); 3 ♀, Thailand, same details but one with date 6. xi. 2002 (coll. GL).

Etymology. This species is named in honour of the specialist on Sphingidae and zealous collector of Lepidoptera, Mr Hermann Schnitzler (Frechen near Köln, Germany).

Eupithecia stueningi Mironov & Galsworthy, **sp. n.** (Fig. 10)

Description (♂♀). Wingspan 17 mm; fore wing 9 mm. Labial palpi brownish grey with white apices. Head covered with brownish grey scales. Notum brownish grey with pale ochreous medial transverse band and whitish ochreous posterior spot. Fore wing triangular with slightly arched costal margin, slightly curved terminal margin and pointed apex; ground colour brownish grey; basal area unicolorous, brownish grey to median line, with stalk of Cu covered with black scales; median line oblique, sinuate, sharply angled onto costa behind discal dot; medial area divided by broad, light, pale ochreous transverse band; outer part of medial area with a series of black dashes on the veins; terminal area narrow with weakly defined large, pale ochreous tornal spot; discal dot small, oblique, ovoid, intensely black; terminal line narrow, blackish, slightly interrupted by veins; fringes chequered dirty white and dark grey. Hind wing rather triangular with slightly concave terminal margin and narrowly rounded apex; ground colour paler, whitish grey; transverse lines broad, brownish grey, well marked along anal margin only; postmedian line formed of a series of narrow blackish dashes on the veins; terminal area narrow, darker, with a series of narrow blackish dashes along its inner border; discal dot considerably smaller and paler, rounded; terminal line and fringes as fore wing. Abdomen light brownish grey with ochreous tinge.

Male genitalia (Fig. 25). Uncus biapical, stout and triangular in ventral view. Valve parallel sided, tapering slightly to well rounded apex; sacculus slightly expanded, its apex marked by a sinuous curve. Vinculum broad, centrally slightly emarginate. Papillae on the anterior arms of labides short, parallel-sided. Aedeagus slightly shorter than valve. Vesica armed with one sharp cornutus at apex, a small irregular rhomboid plate at its base, and a stout, but pointed cornutus near base. Sternite A8 broadly diamond-shaped at base, with a strong basal hollow, and tapering regularly to apex, slightly more strongly sclerotized at distal edges and tip.

Female genitalia (Fig. 19). Bursa copulatrix globular, densely covered with small spines. Ductus bursae very long, curled around anterior part of bursa, and thence expanding very gradually to colliculum, with a single row of longitudinally placed short spines near posterior end. Ductus seminalis leaving ductus bursae just below colliculum, and greatly expanded thereafter. Colliculum well sclerotized, parallel-sided. Tergite A8 broad and slightly elongate, apophyses posteriores and anteriores narrow, but well sclerotized; papillae anales broad and rather square.

Range. Thailand. Known from Chiangmai Province.

Similar species. This species belongs to the *tripunctaria* group (Mironov, 2003). It is similar to *E. invicta* Vojnits, 1983 (N. India), but distinguished from it by the presence of a broad, pale ochreous transverse band behind the discal dot in the medial area of the fore wing. It is also similar to *E. tenuisquama* Warren, 1896 (Himalayas to Japan), but considerably smaller. The male genitalia differ from both of these by the shape of the sacculus, and by the ornamentation of the aedeagus vesica. The female genitalia are very similar indeed to those of *E. tenuisquama*, but lack the sinuate margins to sternite A8 which are present in the latter.

Holotype. ♂, Thailand, Chiangwat Chiang Mai, Mt Doi Phahompok, 14 km NW of Fang, 2,000 m, 14. ii. 2000, leg. Márton Hreblay, Mironov slide no. 595 ♂ (ZFMK). Paratypes. 3 ♀, same locality, but 20 km NW of Fang, 2,150 m, 23–25. i. 2004, leg. A. Szabó, Mironov slide no. 575 ♀ (coll. GL); 1 ♂, [Burma], Htawgaw, March 1923, leg. A. E. Swann, L. B. Prout coll., BM 1939-643, BM Geometrid slide no. 21992 (BMNH).

Etymology. This species is named in honour of Dr Dieter Stüning (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany), a specialist on geometrid moths.

Eupithecia swanni Mironov & Galsworthy, **sp. n.** (Fig. 11)

Description (♀). Wingspan 25.5 mm; fore wing 12.5 mm. Fore wing narrow and elongate, costa slightly bowed at base, otherwise straight; apex narrow, apical angle very acute; ground colour pale brown, basal, antemedial and postmedial lines all right-angled near costa, darker brown; apex and terminal area darker brown, crossed by pale wavy terminal line; discal dot well marked, very dark, and round. Hind wing paler, curved postmedial and terminal area mid brown; discal dot smaller than on fore wing. Marginal line on both wings dark brown, scalloped, and fringes chequered brown and white.

Male. Unknown.

Female genitalia (Fig. 31). Bursa copulatrix globular, all but an area extending from the posterior end obliquely to about two thirds covered with relatively small spines; a small diverticulum at posterior end, to which ductus seminalis is attached. Ductus bursae long and fairly stout, with a large diverticulum at middle, and a field of small spines opposite; antrum membranous, elongate. Tergite A8 broader than long, with curved posterior margin. Apophyses relatively narrow, slightly expanded and flattened at their apices. Papillae anales short and rounded.

Range. Myanmar.

Similar species. This species is similar to *E. robiginascens* Prout, 1926 (Himalayas to China), but smaller and paler, with more pointed wings. The female genitalia are distinct, particularly in having a different pattern of spining in the bursa, and the length of the ductus bursae below the diverticulum much shorter.

Holotype. ♀, [Myanmar] Htawgaw, N. E. Burma, 6,000 ft, A. E. Swann, September–October (19)23, L. B. Prout coll. BM 1939-643, BM geometrid slide no. 22001 (BMNH).

Etymology. The species is named after Captain A. E. Swann (see introduction).

Note. This specimen was recorded as *Eupithecia* sp. n. by Prout (1926: 316), but not named. It is rather worn, and the right wings are torn.

Eupithecia burmata Mironov & Galsworthy, **sp. n.** (Fig. 12)

Description (♀). Wingspan 24 mm; fore wing 14 mm. Fore wing elongate, relatively broad, costa slightly bowed, termen rounded; ground colour pale brown; a zigzag pale medial band crossing discal area, with a right angle at level of discal dot, and a narrow brown medial line in its centre; also a vague pale postmedial fascia, not reaching dorsal margin, and with two dark dashes and two dots between veins on upper section; discal dot dark, slightly elongate; a wavy pale submarginal line; marginal consisting of a dark line interrupted on veins; fringes chequered brown and white. Hind wing broad, roughly triangular; ground colour dirty white, with brown shading marking transverse lines on anal margin, and some shading on termen; discal dot small, round; marginal and fringes as fore wing.

Male. Unknown.

Female genitalia (Fig. 30). Bursa copulatrix narrow and elongate, with a more or less globular patch of medium spines in its upper half; on the right side, a long and narrow diverticulum, about the same length as the bursa, with a few scattered small spines in its lower part, and a small patch at its upper part; at junction of bursa and diverticulum, a prominent patch of large spines at point where ductus seminalis joins bursa. Ductus bursae not developed, and colliculum lacking; antrum membranous, very short. Tergite A8 large, square, with a rounded posterior margin; apophyses all narrow and relatively short. Papillae anales rather short and square.

Range. Myanmar.

Similar species. This species may perhaps belong to the *undata* group (Mironov, 1990). The facies is unique, and should be immediately recognisable. The female genitalia, especially the corpus bursae and its ornamentation, somewhat resemble those of *E. alishana* Inoue, 1970 (Taiwan) and *E. impavida* Vojnits, 1979 (Himalayas to Japan).

Holotype. ♀, Burma, 28°8′N, 97°24′E, 11,000 ft, 29. vi. 1926, leg. F. Kingdon Ward, BM 1927-100, BM geometrid slide no. 21632 (BMNH).

Eupithecia kuni Mironov & Galsworthy, **sp. n.** (Fig. 13)

Description (♀). Wingspan 21–21.5 mm; fore wing 11–11.5 mm. Fore wing rather broad, costa slightly bowed, apex broad, termen strongly curved; ground colour a uniform pale fawn; transverse lines very faint, slightly darker than ground colour, antemedial straight and oblique, postmedial sharply angled at level of discal dot; terminal area slightly darker, with a faint pale wavy submarginal; discal dot small; marginal line continuous, dark brown; fringes chequered fawn and white. Hind wing broad, tornus very rounded; paler than fore wing, with numerous transverse lines showing on anal half; discal dot small and faint; marginal line and fringes as fore wing.

Male. Unknown.

Female genitalia (Fig. 33). Bursa copulatrix pear-shaped, covered throughout with medium spines. Ductus seminalis attached to bursa at about one half, initially broad with a row of spines on posterior side, then becoming abruptly narrow. Ductus bursae not developed. Colliculum attached to neck of bursa, rather short, slightly inclined to one side; antrum broad and membranous. Tergite A8 rectangular, longer than wide, with a curved posterior margin; apophyses relatively narrow, and of normal length. Papillae anales slightly elongate and narrow at tips.

Range. Vietnam.

Similar species. We cannot as yet assign *E. kuni* sp. n. with confidence to any obvious species-group within the genus *Eupithecia*. It is externally very similar to some other Asian *Eupithecia* species, such as *E. tenuisquama* Warren, 1896 (Himalayas to Japan), *E. blandula* Mironov & Galsworthy, 2007 (Taiwan), *E. stueningi* sp. n. and *E. mira* Vojnits, 1988 (Nepal). The female genitalia of *E. kuni* can be used to distinguish it from these species with accuracy and are rather similar to the genitalia of the Chinese *E. villica* Mironov & Galsworthy, 2006, but are easily distinguished by the larger spines in the corpus bursae and the sclerotized base of the ductus seminalis with a row of stout spines.

Holotype. ♀, Vietnam, prov. Lao Cai, 1,900–2,000 m, Fan-Si-Pan mts., 14 km N. W. Sa Pa, 103°46.06′E. 22°20.9′N., 14–15. xi. 1999, leg. A. Kun & L. Ronkay, Galsworthy slide no. ACG GL67 (coll. GL). Paratype. 1 ♀, Vietnam, Prov. Lao Cai, Fan-si-pan Mts, 3 km NW Cat Cat, 2,000 m, 1. xii. 1997, leg. L. Peregovits & L. Ronkay, Mironov slide no. 596 ♀ (TTM).

Etymology. This species is named in honour of the Hungarian lepidopterologist Mr András Kun (Hungarian Natural History Museum, Budapest, Hungary), a specialist on Microlepidoptera.

Note. Both specimens are worn: it is likely that the pattern would be more clearly marked on fresh specimens.

Eupithecia peregovitsi Mironov & Galsworthy, **sp. n.** (Fig. 14)

Description (♂♀). Wingspan 25–26 mm, fore wing 14–15 mm. Fore wing broad, costa bowed near rather broad apex, termen and dorsum forming a continuous curve; ground colour pale brown, basal area slightly darker, bounded by a curved basal line; antemedian a double pale wavy line, not angled; median similar, passing close to discal dot, and sharply angled behind it; postmedian similar, with a line of dark dashes on the veins proximally to it; vein Sc basally with three dark well separated dashes, extending to about one half of costa; discal dot well marked, oval, with two dark costal patches on either side above it; a third dark costal patch subapically, beyond the postmedian; terminal area slightly darker than ground colour, with a wavy dark submarginal line crossing it and a prominent dark subtornal patch; marginal line dark, interrupted on veins, fringes chequered brown and white. Hind wing broad, and approximately triangular, with a marked anal angle; ground colour white; transverse lines well marked in brown along anal margin, abruptly terminated at cubital vein, except for faint postmedian; discal dot small; marginal line and fringes as fore wing.

Male genitalia (Fig. 29). Uncus uniapical, short, broadly triangular in ventral view, with a large flared plate at base. Valves broad, costa slightly bowed, and ventral margin strongly curved upwards in distal half, forming a narrow and upward pointing apex. Sacculus unmodified; vinculum strongly sclerotized, tapering towards saccus, the latter abruptly squared at

apex. Papillae on the anterior arms of the labides rather stout and short, the distal half covered with setae; aedeagus very stout and long, a little less than twice length of valve; vesica armed with a single cornutus running whole length of aedeagus, and a patch of medium spines. Eighth sternite broad at base, tapering towards apex, the posterior half consisting of two pointed arms; basal hollow shallow.

Female genitalia (Fig. 32). Bursa copulatrix large, globular, covered throughout with spines. Ductus seminalis attached to bursa at posterior end, broad at first, and curling round bursa, then narrowing abruptly at base of bursa; ductus bursae broad and short, and heavily sclerotized, merging with large and broad colliculum. Antrum membranous. Tergite A8 very large, elongate, with curved posterior margin. Apophyses anteriores unusually stout and heavily sclerotized, apophyses posteriores narrower and rather long. Papillae anales broad, rounded at tip, and covered with short setae.

Range. Vietnam. Known from Province Lao Cai.

Similar species. The species belongs to the *proterva* group, and has similar external patterning to a subgroup within this assembage consisting of *E. jermyi* Vojnits, 1976 (S. China, Vietnam), *E. costinotata* Inoue, 2000 (Nepal), and *E. lini* Mironov & Galsworthy, 2007 (Taiwan: it is the undescribed Vietnamese species referred to in Mironov & Galsworthy (2007)). It is externally very similar to *E. lini*, and best distinguished in the male genitalia, where the valve is shorter and broader than in *E. lini*, and the aedeagus considerably longer, with a pointed rather than blunt cornutus.

Holotype. ♀, Vietnam, prov. Lao Cai, 2,650 m, Fan-Si-Pan Mts, 7 km W. Sa Pa, 103°48′E. 22°18′N., 1–2. ii. 1999, leg. L. Peregovits & G. Ronkay. Paratypes. 1 ♀, details as holotype, Galsworthy slide no. ACG GL84; 1 ♂, Vietnam, prov. Lao Cai, 2,100 m, Fan-Si-Pan Mts, 6 km W. Sa Pa, 103°48.5′E. 22°17.9′N, 3. ii. 1999, leg. L. Peregovits & G. Ronkay, Galsworthy slide no. ACG GL59 (all coll. GL); 1 ♂3 ♀, Vietnam, Prov. Lao Cai, 2,650 m, Fan-si-pan Mts, 7 km W Sa Pa, 103°48′E, 22°18′N, 1–2. ii. 1999, leg. L. Peregovits & G. Ronkay (TTM, ZISP); 1 ♂1 ♀, Vietnam, Prov. Lao Cai, 2,100 m, Fan-si-pan Mts, 6 km W Sa Pa, 103°48.5′E, 22°17.9′N, 3. ii. 1999, leg. L. Peregovits & G. Ronkay (TTM).

Etymology. This species is named in honour of the Hungarian lepidopterologist Dr László Peregovits (Hungarian Natural History Museum, Budapest, Hungary), a specialist on Noctuidae and other Macrolepidoptera.

Eupithecia herczigi Mironov & Galsworthy, **sp. n.** (Fig. 15)

Description (♀). Wingspan 18–20 mm; fore wing 9–10 mm. Fore wing relatively short and broad, apex broadly rounded; ground colour dirty white, with 4–5 brown blotches along costa; transverse lines absent, except for postmedian, which consists of a single crenellated brown line, slightly angled subcostally; terminal area brown, crossed by a wavy submarginal white line, accentuated close to costa, and at tornus and again slightly above tornus, showing as two white spots; discal dot relatively large and prominent, round; marginal line brown, continuous; fringes chequered brown and white. Hind wing almost entirely shaded darker brown, with prominent round discal spot; anal and terminal areas darker, the latter with submarginal, marginal and fringes as fore wing.

Male. Unknown.

Female genitalia (Fig. 34). Bursa copulatrix elongate, the anterior third densely covered with small spines; rest of bursa membranous, well corrugated, with a large field of large spines on ventral side, dividing into two rows of spines which meet the field of small spines.

Ductus seminalis very broad, attached to bursa opposite large spine field. Ductus bursae not developed. Colliculum short and broad. Antrum membranous, quite broad. Tergite A8 slightly transverse, with a short emargination in the middle of its anterior margin, and a curved posterior margin with a slightly transparent window at centre. All apophyses relatively narrow, but well sclerotized. Papillae anales short and rounded, covered with short and medium setae.

Range. Thailand.

Similar species. This species belongs to the *semigraphata* group (Schütze, 1956, as subgenus *Dietzea*). Externally it is not unlike paler specimens of *E. semigraphata* Bruand, 1851 (Europe to Transcaucasus) or *E. poecilata* Püngeler, 1888 (Corsica and Sardinia), but is easily told from either by the much heavier discal dots, which give it the appearance of a small ennomine. The female genitalia follow the general pattern of all known members of the group, but the arrangement of larger spines is unique to this species.

Holotype. ♀, North Thailand, Prov. Chiang Mai, 900 m, between Chiang Dao and Kariang, 98°48′E 19°25′N, 8. xi. 2002, leg. B. Herczig & G. Ronkay. Paratype. 1 ♀, same data as holotype, Galsworthy slide no. ACG GL88 (both coll. GL).

Etymology. This species is named in honour of the zealous Hungarian collector of Lepidoptera Dr Béla Herczig (Plant Health and Soil Conservation Station, Tata, Hungary).

Eupithecia laoica Mironov & Galsworthy, **sp. n.** (Fig. 16)

Description (♂). Wingspan 17.5–20 mm, fore wing 10–11.5 mm. Frons and collar pale brown; tegulae white, posterior scales tipped brown; thorax brown centrally, white laterally; abdomen pale brown, apart from first and seventh and eighth segments, which are shining white. Fore wing relatively short and broad, costa straight, termen gently curved and dorsum straight; ground colour dingy brown, transverse lines absent apart from dark costal blotches marking antemedial, medial and postmedial; postmedial marked by short darkening of veins, bordered on outer side by a pale fascia, doubly angled near costa; discal dot large, dark brown, slightly elongate; terminal area shaded darker; submarginal absent; marginal a narrow, complete dark brown line; fringes chequered mid and pale brown. Hind wing short and well rounded, termen slightly sinuate; ground colour as fore wing, discal dot tiny and very faint; postmedial visible as a complete darker band; terminal area, marginal line and fringes as fore wing.

Male genitalia (Fig. 35). Uncus rather elongate. Valve parallel-sided, broadly rounded at tip. Sacculus slightly sinuate at base, otherwise undeveloped. Vinculum short, broad, slightly emarginate at middle; papillae on anterior arms of labides elongate, parallel-sided, with uniform fine setae at tips; aedeagus equal to length of valve, and rather broad. Vesica armed with one long, straight cornutus, one shorter sinuate cornutus near apex, a sinuate sclerite, covered with short spines, also near apex, and a short broad cornutus with a narrow, sharp tip near base. Sternite 8 elongate, narrowing towards apex, divided from one third into two pointed arms, a shallow hollow at base, and a very long one at apex.

Female. Unknown.

Range. Laos.

Similar species. Externally very similar to *E. invicta* Vojnits, 1981 (N. India). The male genitalia are similar to those of *E. fulvipennis* Butler, 1889 (southern Himalayas), but distinguished from it by the presence of a short ventral process near the base of the valve, the nar-

row and elongate patch of dense spicules on the vesica, the different shape and length of the two horn-like cornuti (one about twice as short as the other) and the shorter sternite A8 with a shallower basal hollow.

Holotype. ♂, Laos, Sam Neua, Phu Pan, 1,750 m, 15–17. x. 2005, leg. Mamoru Owada, Galsworthy slide no. ACG NSMT-14. Paratypes. 2 ♂, same data as holotype, Galsworthy slide no. ACG NSMT-20 (all NSMT).

Note. All three specimens are rather worn.

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摘　　要

東南アジア大陸部のカバナミシャク属 I (V. MIRONOV ・ A. C. GALSWORTHY)

東南アジア大陸部のカバナミシャク属 (*Eupithecia*) を検討した結果, ミャンマー, ラオス, ベトナム, タイなどから計51種を認めた. 今回の第1報では, それらのうちの次の15新種の記載を行った. *E. skoui* sp. n. (タイ), *E. macrodisca* sp. n. (タイ), *E. szaboi* sp. n. (タイ), *E. tropicata* sp. n. (タイ), *E. thaica* sp. n. (タイ), *E. hreblayi* sp. n. (タイ), *E. ronkayi* sp. n. (ミャンマー, タイ), *E. schnitzleri* sp. n. (タイ), *E. stueningi* sp. n. (タイ), *E. swanni* sp. n. (ミャンマー), *E. burmata* sp. n. (ミャンマー), *E. kuni* sp. n. (ベトナム), *E. peregovitsi* sp. n. (ベトナム), *E. herczigi* sp. n. (タイ), *E. laoica* sp. n. (ラオス).

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